THE RELATIONSHIP BETWEEN VOLATILITY, CORRELATION & PORTFOLIO PROTECTION

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As academic research has evolved from the single-factor approach of the capital asset pricing model (CAPM) in the 1960s to more sophisticated, multiple-factor models today, market participants who can separate noise from predictive signals have been able to generate excess returns versus the market. Over the last couple of years, I have written about asset correlations and predictive signals for spikes in volatility. In this article, I will take a step further, combining both into a single analysis that seeks to demonstrate a link between correlations and both dispersions and forward volatility. Most importantly, I'll also identify specific strategies that could provide protection during periods of rising uncertainty.

Correlation Curves

In a recent post, I introduced the idea of correlation curves. To summarize, this approach plots a term structure of average correlations in the equity market in the same way traders think about the term structure of interest rates. That is, each point of the curve is the average of pairwise correlations between all stocks in an equity market across time on the x-axis.

In markets lacking systematic risk, the only difference between the calculation of near-term correlations (i.e., one or two months) and longer tenors (i.e., 24 or 36 months) is simply the addition of more historical data. Thus, average correlation numbers for different windows should not be statistically different. By examining this data, it's now possible to track changes in the shape of the curve and assess how systematic risk in the market is evolving.

The table below illustrates the three most recent economic crises and how the correlation term-structure went into what the futures world refers to as "backwardation," i.e., near-term correlation values are higher than far-term correlation values. Over longer periods, such as 36 months, correlations tend to converge toward the non-crisis average of 0.35, as represented by the last row of the table. In short, increasing correlation is a harbinger of increasing volatility.

Average Trailing Correlations for S&P 500 Index Stocks During Economic Crises

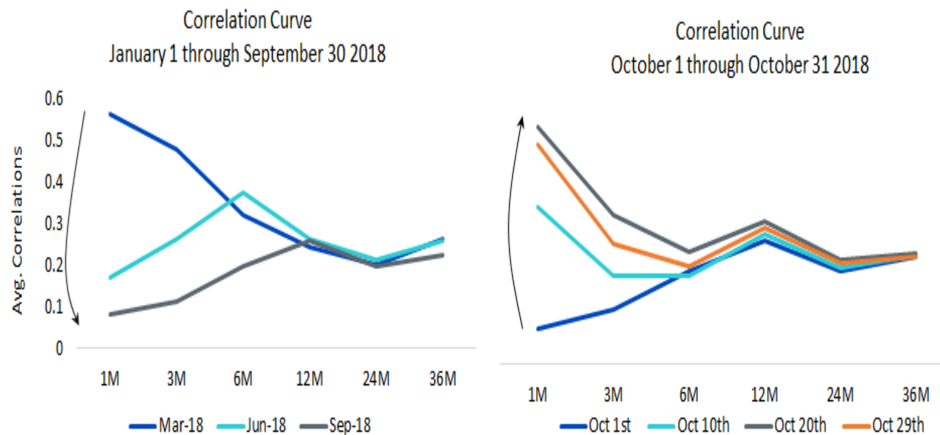
	Dates	Market Correction	1 Month	3 Months	6 Months	12 Months	24 Months	36 Months
Asian Crisis	07/31/98–08/31/98	-14.50%	0.58	0.43	0.37	0.53	0.22	0.21
Tech Bubble	08/31/00–09/30/02	-44.70%	0.41	0.39	0.37	0.35	0.32	0.33
Financial Crisis	11/30/07–02/27/09	-48.80%	0.46	0.46	0.47	0.45	0.39	0.36
Entire Period ex Crisis Period Covered - 12/31/94–09/30/18		-	0.34	0.34	0.35	0.35	0.36	0.36

Sources: WisdomTree, Bloomberg. As of 09/30/18. Past performance is not indicative of future results. You cannot invest directly in an index.

Wagging Tail of Correlations: Going Up or Down?

In the chart below left, I plot the correlation curve as of Q1, Q2 and Q3 2018. After the massive spike in volatility on Feb 5, the curve gradually started to flatten (i.e., near-term correlations were declining faster than medium and longer-term correlations). **As the tail of the correlation curve went down over the following six months, the S&P 500 rallied by more than 11%.**

In the chart to the right, I conduct a similar analysis, plotting the correlation curve every 10 days in October 2018. As correlations rose over the period, ***markets tanked by almost 7%.***



Sources: Bloomberg, WisdomTree. As of 10/30/18. Past performance is not indicative of future results.

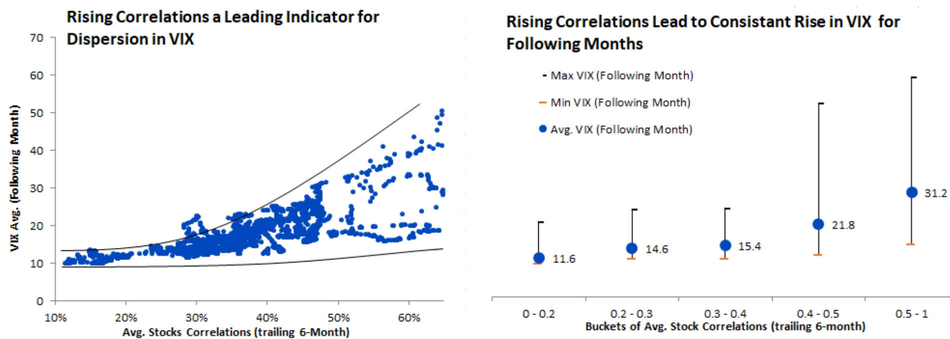
For definitions of terms in the chart, please visit our glossary.

In my view, the wagging of the correlation tail is a signal for market behavior. If the tail goes down, the market goes up (and vice versa).

Accelerating Correlations: A Canary in a Coal Mine?

Taking this analysis a step further, it appears that average correlations could have a predictive power to forecast forward volatility.

In the chart below left, I show average six-month trailing pairwise stock correlations across all equities in the S&P 500 Index plotted against average VIX levels in the following month on the y-axis. In the chart on the right, I plot the ranges of the VIX for a given correlation bucket.



Sources: Bloomberg, WisdomTree. As of 10/30/18. Past performance is not indicative of future results. You cannot invest directly in an index.

Our takeaways:

1. Generally, higher correlations across equities led to higher VIX levels the following month. Thus, rising correlations acted as a signal of higher VIX in the future.

2. Higher correlations in equities also tend to lead to a big dispersion in VIX ranges over the following month.

To summarize, accelerating correlations not only act as a precursor for spikes in the VIX, but also indicate potentially unstable swings in values of the VIX.

How Should Investors Allocate in this Environment?

To answer this key question, let's look at few high-level trends:

1. After nearly a decade of supportive monetary policy that kept volatility constrained, we are entering a period in which interest rates are rising.

2. As markets adjust to a reduction in global central bank balance sheets, systematic risk has the potential to drive correlations higher, which in turn could increase volatility.

3. Given current trade tensions between the U.S. and China, market volatility appears to be increasing as investors grapple with uncertainty.

In our view, none of these challenges are insurmountable for equity markets if earnings continue to grow. However, an alternative method of stock selection and volatility mitigation may become necessary. As pioneers of Modern Alpha™ strategies, WisdomTree has a host of strategies that can help investors navigate the current environment:

1. **WisdomTree U.S. Multifactor Fund (USMF)**: This strategy aims to provide multifactor exposure to U.S. equities through a combination of fundamental (value and quality) and technical (momentum and correlations) factors. USMF aims to deliver quality stock selection that can withstand periods of heightened systematic risk.

2. **WisdomTree CBOE S&P 500 PutWrite Strategy Fund (PUTW)**/**Russell 2000 PutWrite Strategy Fund (RPUT)**: Both strategies aim to provide a positive correlation to

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equities, but with significantly lower volatility. These strategies sell one-month at-the-money put options, thereby generating income which could partially offset losses during market corrections. Should markets rise, the put options eventually expire, worthless, allowing investors to generate positive returns. PUTW and RPUT generate income by selling volatility and thus can help lower drawdowns during market corrections.

3. **WisdomTree Dynamic Long/Short U.S. Equity Fund (DYLS)** and **WisdomTree Dynamic Bearish U.S. Equity Fund (DYB)**: These are long/short equity strategies, which seek to add value through security selection, as well as opportunistically hedging market risk, when fundamentals are mixed and volatility is increasing. DYB has the potential to go net short the market to profit from declines in equity prices.

Conclusion

Trends in correlation can be a powerful predictor of future volatility and risk in equity markets. As investors continue to grapple with short-term uncertainty, we believe our correlation signal can provide valuable insights into broader market trends. At present, we believe a more defensive positioning could be warranted as the current bull market enters its latter stages.

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You cannot invest directly in an index.

DEFINITIONS

Capital asset pricing model (CAPM) : a model that describes the relationship between systematic risk and expected return for assets, particularly stocks. CAPM is widely used throughout finance for the pricing of risky securities, generating expected returns for assets given the risk of those assets and calculating costs of capital.

Factor : Attributes that based on its fundamentals or share price behavior, are associated with higher return.

Correlation : Statistical measure of how two sets of returns move in relation to each other. Correlation coefficients range from -1 to 1. A correlation of 1 means the two subjects of analysis move in lockstep with each other. A correlation of -1 means the two subjects of analysis have moved in exactly the opposite direction.

Volatility : A measure of the dispersion of actual returns around a particular average level. .

Futures/Futures Contract : Reflects the expected future value of a commodity, currency or Treasury security.

S&P 500 Index : Market capitalization-weighted benchmark of 500 stocks selected by the Standard and Poor's Index Committee designed to represent the performance of the leading industries in the United States economy.

Flatten : to effect a zero positio.

VIX Future Curve : A futures curve is a curve made by connecting prices of futures contracts of the same underlying, but different expiration dates. VIX futures curve is made of prices of individual VIX futures contract.

Monetary policy : Actions of a central bank or other regulatory committee that determine the size and rate of growth of the money supply, which in turn affects interest rates.

Interest rates : The rate at which interest is paid by a borrower for the use of money.

Balance sheet : refers to the cash and cash equivalents part of the Current Assets on a firms balance sheet and cash available for purchasing new position.

Modern Alpha : Modern Alpha® combines the outperformance potential of active with the benefits of passive—to offer investor strategies that are built for performance.

"At the money" : option's strike price is identical to the price of the underlying security.

Put options : an option to sell assets at an agreed price on or before a particular date.

Drawdowns : Periods of sustained negative trends of return.

Long (or Long Position) : The buying of a security such as a stock, commodity or currency, with the expectation that the asset will rise in value, the opposite of Short (or Short Position).

Short (or Short Position) : The sale of a borrowed security, commodity or currency with the expectation that the asset will fall in value, the opposite of Long (or Long

Position).

Value : Characterized by lower price levels relative to fundamentals, such as earnings or dividends. Prices are lower because investors are less certain of the performance of these fundamentals in the future. This term is also related to the Value Factor, which associates these stock characteristics with excess returns vs the market over tim.

Hedge : Making an investment to reduce the risk of adverse price movements in an asset. Normally, a hedge consists of taking an offsetting position in a related security, such as a futures contract.

Bullish : a position that benefits when asset prices rise.